

## Topical retinoids are the most important active ingredient in dermatology today.

Retinoids are Vitamin A derivatives. Tretinoin is the prescription strength of topical Vitamin A while Retinol does not require a prescription. Retinoids are vital to the normal functioning of all skin structures (i.e. skin, hair, eyes, teeth and nails). In the plant kingdom, Vitamin A functions as a free radical scavenger, protecting plants from UV radiation damage. For humans, topical retinoids work as an antioxidant, enhancing normal functioning of the skin and also assisting in repairing DNA from photodamage.

Retinoids are also known to be humectants that aid in skin hydration. Continuous use of topical retinoids seems to have a cumulative effect in reducing as well as preventing photodamage in skin. Retinoids have also been shown to rebuild the collagen infrastructure in skin.

The basic chemical structure of the retinoid family. Substitute R in the table for the corresponding retinoid chemical value.

### The Retinoid Family

#### Vitamin A Metabolites

Retinyl palmitate  
(R = CH<sub>2</sub>OCC15H<sub>31</sub>)

Retinyl propionate  
(R = CH<sub>2</sub>OCC2H<sub>5</sub>)

Retinyl acetate  
(R = CH<sub>2</sub>OCC2H<sub>5</sub>)

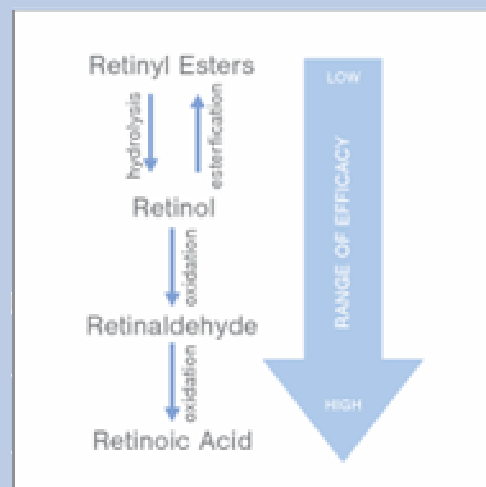
#### Vitamin A Esters

Retinol  
(R = CH<sub>2</sub>OH)

RetinolRetinaldehyde  
(R = CHO)

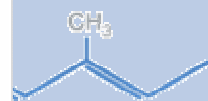
Retinoic Acid  
(R = COOH)

Retinyl Esters represent the most stable compounds, but are much less effective than its retinol counterparts. Much of the efficacy is lost through the hydrolysis conversion.



When retinol is applied to the skin, it gains entrance to the cells through different receptors. Once inside the cell, most of the retinol is stored in the retinyl ester form. When needed, the retinyl esters are hydrolyzed back into retinol.

Once back into the retinol form, the retinol is oxidized into retinaldehyde in a enzymatic process. Retinaldehyde by itself has little biological effect.



The final step is the oxidation of

retinaldehyde into retinoic acid, the most potent form of all vitamin A derivatives.

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